

Understanding the Data

This Glass Performance Guide provides glass only performance data for a comprehensive range of products. We hope you find the guide a useful and valuable resource. Should you require any further assistance or information on any product contained in this guide please contact G.James Glass Products.

Solar Performance of Glass

When the solar spectrum (sunlight) strikes glass, one of three things occurs, it is either reflected (R), absorbed (A) or transmitted (T) in different proportions depending on the glass type. As this fragmentation accounts for 100% of the energy, the sum of the reflection, absorption and transmission is equal to 100% (or 1).

Simply expressed: $R + A + T = 100\%$ (or 1)

Using 5mm grey glass as an example (see diagram on right), 5% of the solar energy is reflected, 48% is absorbed and 47% transmitted – total 100%.

Emission (denoted by the 'E') refers to the portion of absorbed heat which is re-radiated either towards the interior or exterior of the building. In the case of 5mm grey, it is 15% and 33% respectively..

Performance Terms

Following is an explanation of the terms used in the performance charts contained within this booklet.

Visible Light Transmittance

VLT (T_{vis}) is the percentage of visible light (wavelength range 380-780nm) transmitted through the glass. The higher this figure the more daylight the glass allows to enter the building.

Visible Light Reflectance External

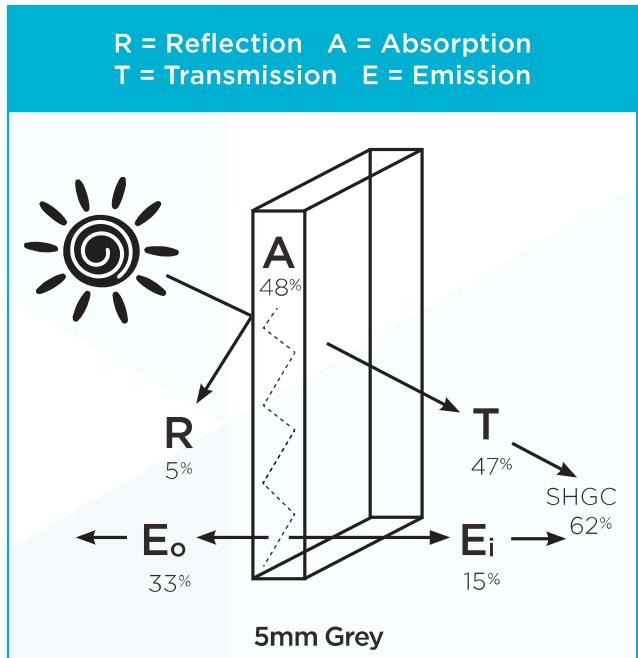
The percentage of visible light (wavelength range 380-780nm) reflected by the glass surface to the exterior.

Visible Light Reflectance Internal

The percentage of visible light (wavelength range 380-780nm) reflected by the glass surface to the interior.

Solar Transmittance (T_{sol})

The percentage of ultra-violet (UV), visible and infra-red (IR) energy (wavelength range 290 - 2500nm) transmitted directly through the glass to the interior.



Solar Reflectance External

The percentage of ultra-violet (UV), visible and infra-red (IR) energy (wavelength range 290 - 2500nm) reflected by the glass surface to the exterior.

Solar Heat Gain Coefficient (SHGC)

Combined total of the directly transmitted solar heat (T) and the portion of the absorbed energy which is re-radiated (through conduction and convection) to the interior of the building (E_i).

SHGC is a calculation of glass solar performance and the lower the figure, the better the glass is able to exclude solar radiation and heat.

With reference to 5mm grey example in the above diagram, these two figures equate to a SHGC of 62% (or 0.62).

U-Value (W/m².K)

A measure of the air-to-air heat transfer due to thermal conductance and the difference in indoor and outdoor temperatures. The lower the number is, the better the insulating qualities of the glass.

How is Data Generated

The sun radiates solar energy (sunlight) by electromagnetic radiation known as the solar spectrum. This spectrum, which spans between 290-2500 nanometres (nm), is divided into three wavelength bands, these are:

- Ultraviolet Radiation (UV) 290nm – 380nm
- Visible Light Radiation (VLT) 380nm - 780nm
- Infrared Radiation (IR) 780nm – 2500nm

The energy distribution within the solar spectrum comprises approximately 2% UV, 47% visible light and 51% infrared. Only the visible light band is seen by the human eye.

Using a spectrophotometer, glass samples are measured across the various wavelengths of the solar spectrum. From this, spectral data is summarised into eight numbers representing:

- Visible Transmission
- Visible Reflectance (surface 1 & 2)
- Solar Transmission
- Solar Reflectance (surface 1 & 2)
- Emissivity (surface 1 & 2)

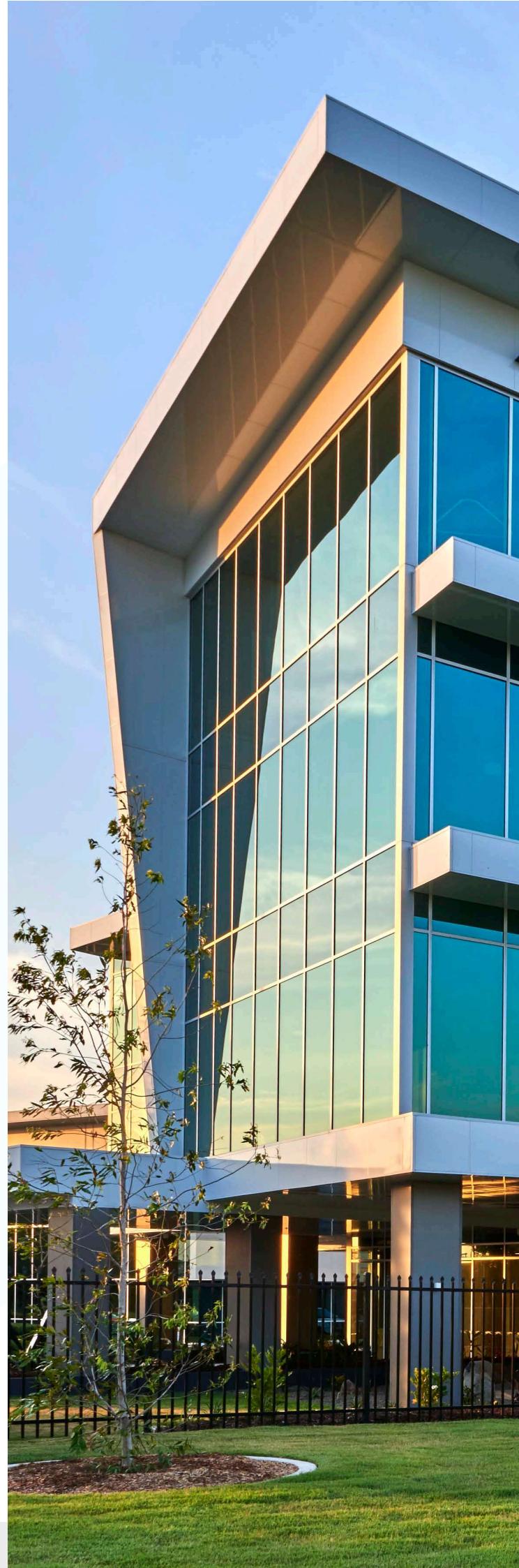
A further measure for thermal conductivity is also assigned to the glass type. Typically, this is approximated as 1 W/(m².K) for monolithic glass, however, the conductivity changes for laminated glass and the air/argon space in Insulated Glass Units (IGUs).

It is important to understand, the shorter the wavelength (i.e. the lower the nm), the higher the radiation energy. This is highlighted by the fact that the shorter, high energy UV radiation wavelength causes humans to sunburn, fabrics to fade and plastics to deteriorate. While the longer, low energy radiation wavelength produced by the visible light and infrared bands are less damaging.

The performance data detailed in this guide include Centre of Glass (COG), U-Value, Solar Heat Gain Coefficient (SHGC) and Shading Coefficient (SC), all of which are calculated using the Lawrence Berkeley National Laboratory (LBNL) Window software program. To ensure all glass types are compared equally, these calculations are conducted under a specific set of environmental conditions as defined by the National Fenestration Rating Council (NFRC) - USA.

These environmental conditions are:

	SHGC	U-Value
Solar Radiation	783 W/m ²	0 W/m ²
Outside Temperature	32°C	-18°C
Inside Temperature	24°C	21°C
External wind Speed	2.75 m/s	5.5 m/s





Contained within the LBNL Window program is the International Glass Database (IGDB), which has an extensive collection of glazing products from glass manufacturers around the world. To ensure accuracy, all entries in this database have been third party certified.

Using the IGDB and the Window program, Centre of Glass (COG) performance data as contained in this document can be calculated for single glazed, IGUs or laminated glass which is constructed using LBNL's Optics program then imported into the Window program.

Centre of Glass Versus Whole of Window Data

Glass only, or Centre of Glass (COG) performance data is an evaluation of the glass, with no contribution from the frame. Whole of Window (WOW) data provides the thermal performance for the complete window including glass and frame. This data is calculated using LBNL's THERM and Window software programs.

The window U Value (Uw Value) and window SHGC (SHGCw) are calculated under Australian Fenestration Rating Council (AFRC) protocols which use the same environmental conditions as NFRC/ASHRAE.

Window Energy Rating Scheme (WERS) data is formally certified whole of window data that has been created and audited independent of the manufacturer. These performance figures are available for G.James products at <https://professional.gjames.com/wers>

The table below highlights the performance difference between glass only data compared to WOW data for a sample selection of windows and doors glazed with this same glass (or IGU). Introducing aluminium framing alters the window/door performance when compared to the glass alone. The difference in framing sections and AFRC 'rated' sizes (per product type) may also result in U-Value and SHGC variations."

	Single Glazed 6mm Clear	IGU 4mm Clr/10mm Air/4mm Clr		
	U or Uw Value	SHGC/w	U or Uw Value	SHGC/w
Glass ONLY	5.8	0.82	2.8	0.77
048 Series Awning Window	6.7	0.61	4.3	0.57
246 Series Sliding Door	6.2	0.72	3.8	0.69

Design Considerations

Viewing Samples

Selecting glass for a project is an important and sometimes difficult task, to assist in this process G.James offers the following recommendation for viewing glass samples.

Usually, the predominate factor in selecting glass is the external appearance, that is the external reflected colour and amount of reflection.

Placing a sample against a white background provides an indication of the transmitted colour not the external reflected colour.

Instead, the samples should be viewed as follows:

Viewing Samples Outdoors (Recommended)

Wherever possible G.James recommends glass samples be viewed outdoors. Evaluating samples outdoors should be conducted under various lighting conditions, i.e. full sun, overcast conditions and full shade.

This will provide the best indication of the external appearance of the glass and assist in determining its suitability.

If possible, the sample should be placed in an open doorway and viewed both externally for reflected colour and internally for transmitted colour. This will best replicate the glass as installed in the building.

Viewing Samples Under Artificial Lighting

When evaluating samples indoors under artificial lighting, the glass appearance is best viewed by placing the glass sample on a dark background.

The sample should be positioned so the overhead lighting can be viewed in reflection from the glass surface. The colour viewed is the true reflected colour of the sample.

Viewing Criteria

- 1 Background should be preferably dark grey or matt black
- 2 Overhead lighting should be white light

Facade Reflectance

Some councils have building regulations determining the maximum visible light reflectance of glazing products. Check with your G.James representative or relevant council for advice.

Glass Cleaning

As each glass product is unique, please refer to <https://gjames.com/resources> for comprehensive cleaning instructions.

Thermal Safety

Tinted, reflective, Low-E coated monolithic and laminated glass products may be subject to thermal fracture.

A thermal safety assessment is recommended to determine if heat treatment of the selected glass is required. Consult with your G.James representative for further advice.

Registered Names

- Solect, OptiLam, EcoTherm, LumaTherm and Solarplus are registered names of G.James Australia Pty Ltd.
- SuperGrey is a registered name of Pilkington.
- Sunergy is a registered trademark of AGC Glass Europe.
- Solarban, Azuria and Solarcool are registered names of Vitro Architectual Glass.
- Panasap is a registered trade name of Ashimas Flat Glass.
- Vanceva is a registered trade mark of Eastman Chemical Company.
- SuperGreen, SuperBlue, SolTech and EVantage are registered names of Oceania Glass.

Should you require performance data for other G.James products then please contact your G.James representative .

Monolithic Glass

Glass Type	Visible Properties (%)			Solar Properties (%)		Centre of Glass Results		
	Trans	Ext. Refl.	Int. Refl.	Direct Trans	Ext. Refl.	Solar Heat Gain Coeff.	U-Value (W/m ² K)	Shading Coeff.
3mm Clear	89	9	8	83	8	0.86	5.9	0.98
4mm Clear	90	9	9	85	9	0.87	5.9	0.99
5mm Clear	89	8	8	79	7	0.83	5.9	0.95
6mm Clear	88	8	8	78	7	0.82	5.8	0.95
8mm Clear	86	8	8	71	7	0.78	5.7	0.89
10mm Clear	85	8	8	67	7	0.75	5.7	0.86
12mm Clear	84	8	8	64	7	0.73	5.6	0.84
15mm Clear	85	7	7	64	6	0.74	5.5	0.85
19mm Clear	83	6	6	59	5	0.71	5.4	0.71
25mm Clear	80	8	8	48	6	0.63	5.2	0.72
3mm Low Iron	91	9	9	90	9	0.90	5.9	1.04
4mm Low Iron	91	9	9	90	8	0.90	5.9	1.04
5mm Low Iron	91	9	9	89	8	0.90	5.8	1.03
6mm Low Iron	91	9	9	88	8	0.89	5.8	1.03
8mm Low Iron	90	9	9	87	8	0.88	5.7	1.02
10mm Low Iron	90	9	9	86	8	0.88	5.7	1.01
12mm Low Iron	90	9	9	86	8	0.88	5.6	1.01
15mm Low Iron	90	9	9	83	8	0.86	5.5	0.99
19mm Low Iron	90	9	9	82	8	0.85	5.4	0.98
4mm Green	82	8	8	58	6	0.69	5.9	0.79
5mm Green	79	7	7	51	6	0.64	5.9	0.74
6mm Green	77	7	7	47	6	0.62	5.8	0.71
10mm Green	68	7	7	34	6	0.53	5.7	0.61
6mm SuperGreen	67	6	6	34	5	0.53	5.8	0.61
4mm Grey	56	6	6	55	6	0.67	5.9	0.77
5mm Grey	47	6	5	47	5	0.62	5.8	0.71
6mm Grey	42	5	5	42	5	0.58	5.8	0.67
8mm Grey	33	5	5	31	5	0.51	5.7	0.59
10mm Grey	25	5	5	26	4	0.48	5.7	0.55
12mm Grey	19	5	5	17	4	0.43	5.6	0.49
5mm Dark Grey	22	4	4	40	5	0.57	5.8	0.65
6mm Dark Grey	15	4	4	34	5	0.53	5.8	0.61
6mm SuperGrey	9	4	4	8	4	0.36	5.8	0.41
6mm Light Grey	63	6	6	55	6	0.67	5.8	0.77
6mm Bronze	49	6	5	48	5	0.62	5.8	0.72
10mm Bronze	32	5	5	33	5	0.53	5.7	0.61
12mm Bronze	26	5	5	28	4	0.50	5.6	0.57
5mm Panasap Dark Blue	61	6	6	48	5	0.62	5.8	0.72
6mm Panasap Dark Blue	58	6	6	43	5	0.59	5.8	0.68
6mm Azuria	68	7	7	32	5	0.52	5.8	0.60
6mm SuperBlue	53	6	6	33	5	0.52	5.8	0.60

Coated Monolithic Glass

Glass Type	Visible Properties (%)			Solar Properties (%)		Centre of Glass Results		
	Trans	Ext. Refl.	Int. Refl.	Direct Trans	Ext. Refl.	Solar Heat Gain Coeff.	U-Value (W/m²K)	Shading Coeff.
4mm Low-E on Clear #2	82	11	12	69	10	0.73	3.8	0.84
6mm Low-E on Clear #2	79	10	11	61	9	0.66	3.7	0.76
10mm Low-E on Clear #2	79	10	11	61	9	0.66	3.7	0.76
6mm Low-E on Green #2	71	9	10	39	7	0.50	3.7	0.57
6mm Low-E on Grey #2	40	6	9	37	7	0.48	3.7	0.55
6mm Low-E on Light Grey #2	57	8	9	45	8	0.54	3.7	0.62
6mm Low-E on SuperGreen #2	61	8	10	28	6	0.41	3.7	0.47
4mm SolTech on Clear #2 (Neutral)	61	8	10	46	8	0.54	3.7	0.62
6mm SolTech on Clear #2 (Neutral)	63	9	10	45	8	0.54	3.7	0.62
10mm SolTech on Clear #2 (Neutral)	62	8	10	43	8	0.53	3.6	0.60
6mm SolTech on Grey #2	30	5	8	23	6	0.37	3.7	0.42
4mm Sunergy on Clear #2 (Neutral)	68	9	10	54	10	0.61	4.2	0.70
6mm Sunergy on Clear #2 (Neutral)	68	9	10	54	10	0.61	4.2	0.70
8mm Sunergy on Clear #2 (Neutral)	67	8	10	47	9	0.56	4.0	0.65
10mm Sunergy on Clear #2 (Neutral)	66	8	10	48	9	0.58	4.0	0.66
6mm Sunergy on Green #2	56	7	9	27	6	0.42	4.0	0.48
6mm Sunergy on Grey #2	34	5	9	29	7	0.43	4.1	0.50
6mm Solarcool on Azuria #2	26	19	36	14	10	0.38	5.8	0.44
6mm Solarcool on Grey #2	17	11	36	23	9	0.44	5.8	0.51
6mm Solarcool on Bronze #2	21	13	36	27	11	0.47	5.8	0.54
6mm EVantage Clear #2	68	23	26	59	17	0.63	3.8	0.73
6mm EVantage Blue Green #2	56	19	27	35	11	0.46	3.8	0.53
6mm EVantage Grey #2	32	10	27	29	8	0.42	3.8	0.48
6mm EVantage Bronze #2	38	11	27	35	10	0.46	3.8	0.53
6mm EVantage SuperBlue #2	39	12	27	23	8	0.37	3.8	0.43
6mm EVantage SuperGreen #2	49	16	27	24	9	0.38	3.8	0.43
6mm Solarplus S108 on Clear #2	9	41	42	7	33	0.21	4.4	0.25
6mm Solarplus S130 on Clear #2	33	18	23	28	14	0.45	5.4	0.52



OptiLam® Laminated Glass

Glass Type	Visible Properties (%)			Solar Properties (%)		Centre of Glass Results		
	Trans	Ext. Refl.	Int. Refl.	Direct Trans	Ext. Refl.	Solar Heat Gain Coeff.	U-Value (W/m²K)	Shading Coeff.
6.38mm Clear Laminate	87	8	8	72	7	0.79	5.8	0.90
8.38mm Clear Laminate	90	9	9	77	8	0.81	5.7	0.93
10.38mm Clear Laminate	86	8	8	66	7	0.74	5.6	0.85
12.38mm Clear Laminate	85	8	8	65	7	0.74	5.6	0.85
6.76mm Clear Laminate	87	8	8	71	7	0.77	5.7	0.89
8.76mm Clear Laminate	90	9	9	75	8	0.80	5.6	0.92
10.76mm Clear Laminate	87	8	9	70	7	0.77	5.6	0.88
11.52mm Clear Laminate	85	8	8	63	6	0.73	5.5	0.83
12.76mm Clear Laminate	85	8	8	64	7	0.73	5.5	0.84
6.76mm Clear Acoustic Laminate	89	8	8	70	7	0.77	5.7	0.89
8.76mm Clear Acoustic Laminate	89	9	9	75	8	0.80	5.6	0.92
10.76mm Clear Acoustic Laminate	87	8	8	69	7	0.76	5.6	0.88
12.76mm Clear Acoustic Laminate	84	8	8	63	6	0.73	5.5	0.83
6.38mm Light Grey Laminate	62	6	6	57	6	0.69	5.8	0.78
8.38mm Light Grey Laminate	63	7	7	61	7	0.71	5.7	0.82
10.38mm Light Grey Laminate	61	6	7	55	6	0.68	5.6	0.78
12.38mm Light Grey Laminate	60	6	6	51	5	0.65	5.6	0.74
6.38mm Grey Laminate	44	6	6	48	6	0.62	5.8	0.71
8.38mm Grey Laminate	45	6	6	51	6	0.64	5.7	0.74
10.38mm Grey Laminate	44	6	6	46	6	0.61	5.6	0.70
12.38mm Grey Laminate	43	5	5	42	4	0.59	5.6	0.68
6.38mm Green Laminate	70	7	7	61	6	0.71	5.8	0.82
8.38mm Green Laminate	72	8	8	65	7	0.74	5.7	0.85
10.38mm Green Laminate	70	7	7	59	6	0.70	5.6	0.81
12.38mm Green Laminate	68	7	7	54	6	0.67	5.6	0.77
6.38mm Bronze Laminate	52	6	6	50	6	0.64	5.8	0.73
8.38mm Bronze Laminate	53	6	6	53	6	0.66	5.7	0.75
10.38mm Bronze Laminate	48	6	6	42	5	0.59	5.6	0.67
12.38mm Bronze Laminate	50	6	6	44	5	0.60	5.6	0.69
6.38mm Cool Blue Laminate	73	7	7	65	7	0.74	5.8	0.85
8.38mm Cool Blue Laminate	75	8	8	69	8	0.76	5.7	0.88
10.38mm Cool Blue Laminate	73	7	7	63	7	0.73	5.6	0.83
12.38mm Cool Blue Laminate	71	7	7	58	6	0.69	5.6	0.80
6.38mm Sky Blue Laminate	58	6	6	58	6	0.69	5.8	0.79
8.38mm Sky Blue Laminate	60	7	7	61	7	0.71	5.7	0.82
10.38mm Sky Blue Laminate	58	6	6	56	6	0.68	5.6	0.78
12.38mm Sky Blue Laminate	57	6	6	51	6	0.65	5.6	0.74
6.76mm Solar X Laminate	81	8	8	49	6	0.63	5.7	0.72
6.76mm Solar Y Laminate	74	7	7	35	6	0.54	5.7	0.62

Solect® Laminated Glass

Glass Type	Visible Properties (%)			Solar Properties (%)		Centre of Glass Results		
	Trans	Ext. Refl.	Int. Refl.	Direct Trans	Ext. Refl.	Solar Heat Gain Coeff.	U-Value (W/m²K)	Shading Coeff.
6.38mm Solect Clear 119 #4 Laminate	82	11	11	63	9	0.68	3.7	0.78
8.38mm Solect Clear 119 #4 Laminate	81	11	12	63	9	0.68	3.7	0.79
10.38mm Solect Clear 119 #4 Laminate	79	11	12	58	8	0.65	3.7	0.74
12.38mm Solect Clear 119 #4 Laminate	78	10	11	55	8	0.62	3.6	0.71
6.38mm Solect Neutral 11S #4 Laminate	68	8	10	47	8	0.57	4.0	0.65
10.38mm Solect Neutral 11S #4 Laminate	66	8	10	45	7	0.56	4.0	0.64
6.38mm Solect 11E #4 Laminate	60	8	10	42	7	0.52	3.6	0.60
8.38mm Solect 11E #4 Laminate	59	8	9	41	7	0.51	3.6	0.59
10.38mm Solect 11E #4 Laminate	59	8	10	39	7	0.50	3.6	0.57
6.38mm Solect Pewter 129 #4 Laminate	41	6	9	40	7	0.50	3.7	0.58
8.38mm Solect Pewter 129 #4 Laminate	41	6	9	40	7	0.51	3.7	0.59
10.38mm Solect Pewter 129 #4 Laminate	40	6	9	37	6	0.48	3.7	0.56
12.38mm Solect Pewter 129 #4 Laminate	39	6	9	35	6	0.47	3.6	0.54
6.38mm Solect Blue Green 139 #4 Laminate	64	8	10	52	8	0.60	3.7	0.69
8.38mm Solect Blue Green 139 #4 Laminate	65	9	11	53	8	0.61	3.7	0.70
10.38mm Solect Blue Green 139 #4 Laminate	64	9	11	49	7	0.57	3.7	0.66
6.38mm Solect 149 #4 Laminate	47	7	9	41	7	0.52	3.7	0.59
10.76mm Solect 149 #4 Laminate	47	7	10	39	6	0.50	3.7	0.57
6.38mm Solect 159 #4 Laminate	53	7	10	48	7	0.57	3.7	0.66
8.38mm Solect 159 #4 Laminate	54	7	9	50	7	0.58	3.7	0.66
10.38mm Solect 159 #4 Laminate	53	6	9	45	6	0.55	3.7	0.63
6.38mm Solect Blue 169 #4 Laminate	67	9	10	55	8	0.62	3.7	0.72
10.38mm Solect Blue 169 #4 Laminate	67	8	10	52	7	0.60	3.7	0.69
6.38mm Solect Shadow 1H9 #4 Laminate	56	7	10	48	7	0.60	3.7	0.65
8.38mm Solect Shadow 1H9 #4 Laminate	54	6	9	46	7	0.55	3.7	0.63
10.38mm Solect Shadow 1H9 #4 Laminate	56	8	10	45	7	0.55	3.7	0.63
6.38mm Solect 179 #4 Laminate	62	7	9	48	6	0.57	3.7	0.66
10.38mm Solect 179 #4 Laminate	61	8	10	45	7	0.55	3.7	0.63
10.76mm Solect Clear Plus 1X9 #4 Laminate	74	10	11	41	6	0.52	3.7	0.60
10.76mm Solect 1Y9 #4 Laminate	67	9	11	31	6	0.44	3.7	0.51
8.76mm Solect 219 #4 Laminate	73	10	11	43	7	0.53	3.7	0.61
10.38mm Solect 219 #4 Laminate	69	9	11	36	6	0.48	3.7	0.55
10.76mm Solect 229 #4 Laminate	35	6	9	21	5	0.37	3.7	0.42
10.76mm Solect 239 #4 Laminate	56	8	10	30	6	0.43	3.7	0.50
10.76mm Solect 249 #4 Laminate	41	6	9	23	5	0.38	3.7	0.44
10.76mm Solect 269 #4 Laminate	58	8	10	31	6	0.44	3.7	0.51
8.76mm Solect 2X9 #4 Laminate	68	9	11	33	6	0.46	3.7	0.52
10.76mm Solect 2X9 #4 Laminate	64	9	11	29	6	0.42	3.7	0.49
8.38mm Solect 319 #4 Laminate	50	7	10	40	6	0.51	3.7	0.59
10.38mm Solect 319 #4 Laminate	38	5	9	30	5	0.44	3.7	0.50
8.38mm Solect 329 #4 Laminate	25	5	9	26	5	0.40	3.7	0.46
10.38mm Solect 329 #4 Laminate	19	5	9	20	5	0.35	3.7	0.41
10.76mm Solect 419 #4 Laminate	44	6	10	35	6	0.47	3.7	0.54

Solect® Laminated Glass (Cont)

Glass Type	Visible Properties (%)			Solar Properties (%)		Centre of Glass Results		
	Trans	Ext. Refl.	Int. Refl.	Direct Trans	Ext. Refl.	Solar Heat Gain Coeff.	U-Value (W/m²K)	Shading Coeff.
10.38mm Solect 5a19 #4 Laminate	47	7	10	25	5	0.40	3.7	0.46
10.76mm Solect 5a19 #4 Laminate	48	7	10	26	5	0.41	3.7	0.47
10.76mm Solect 5a29 #4 Laminate	25	5	9	15	5	0.32	3.7	0.37
10.76mm Solect 5a39 #4 Laminate	39	6	9	22	5	0.37	3.7	0.43
10.76mm Solect 5a69 #4 Laminate	41	6	9	23	5	0.38	3.7	0.44
10.76mm Solect 5p19 #4 Laminate	52	7	10	32	5	0.45	3.7	0.52
10.76mm Solect 5p29 #4 Laminate	26	5	9	19	5	0.35	3.7	0.41
10.76mm Solect 5p39 #4 Laminate	42	6	9	26	5	0.41	3.7	0.47
10.76mm Solect 5p69 #4 Laminate	44	6	9	28	5	0.42	3.7	0.48
10.76mm Solect 719 #4 Laminate	61	8	10	26	5	0.40	3.7	0.46
10.76mm Solect 729 #4 Laminate	31	5	9	14	5	0.31	3.7	0.36
10.76mm Solect 739 #4 Laminate	50	7	10	21	5	0.36	3.7	0.42
10.76mm Solect 769 #4 Laminate	52	7	10	22	5	0.37	3.7	0.43
6.38mm Solect Green 819 #4 Laminate	69	9	11	38	6	0.49	3.7	0.56
8.38mm Solect Green 819 #4 Laminate	65	9	11	33	6	0.45	3.7	0.52
10.38mm Solect Green 819 #4 Laminate	60	8	10	27	5	0.41	3.7	0.47
10.76mm Solect 829 #4 Laminate	30	5	9	15	5	0.32	3.7	0.37
10.76mm Solect 839 #4 Laminate	48	7	10	22	5	0.37	3.7	0.43
10.76mm Solect 869 #4 Laminate	50	7	10	23	5	0.38	3.7	0.44

OptiLam® Vanceva® Laminated Glass

Glass Type	Visible Properties (%)			Solar Properties (%)		Centre of Glass Results		
	Trans	Ext. Refl.	Int. Refl.	Direct Trans	Ext. Refl.	Solar Heat Gain Coeff.	U-Value (W/m²K)	Shading Coeff.
6.38mm Coral Rose Laminate Vanceva 0001	76	7	7	69	7	0.76	5.7	0.88
6.38mm Aquamarine Laminate Vanceva 0002	77	8	8	67	7	0.75	5.7	0.86
6.38mm Smoke Grey Laminate Vanceva 0003	76	7	7	65	7	0.74	5.7	0.85
6.3mm Sahara Sun Laminate Vanceva 0004	81	8	8	63	7	0.72	5.7	0.83
6.38mm Ruby Red Laminate Vanceva 0005	49	6	6	65	6	0.73	5.7	0.84
6.38mm Sapphire Laminate Vanceva 0006	51	6	6	54	6	0.67	5.7	0.76
6.38mm Evening Shadow Laminate Vanceva 0007	51	6	6	48	6	0.62	5.7	0.72
6.38mm Golden Light Laminate Vanceva 0008	84	8	8	67	7	0.75	5.7	0.86
6.38mm Arctic Snow Laminate Vanceva 0009	67	7	7	56	6	0.68	5.7	0.78
6.38mm Cool White Laminate Vanceva 000A	80	8	8	63	7	0.73	5.7	0.83
6.38mm Deep Red Laminate Vanceva 000C	16	5	5	37	5	0.55	5.7	0.63
6.38mm True Blue Laminate Vanceva 000D	13	5	5	41	6	0.58	5.7	0.66
6.38mm Pure White Laminate Vanceva 000F	6	5	5	8	4	0.36	5.7	0.42
6.38mm Absolute Black Laminate Vanceva 000G	0	5	5	0	4	0.31	5.8	0.36
6.38mm Ocean Grey Laminate Vanceva 000H	62	6	6	57	6	0.69	5.8	0.78

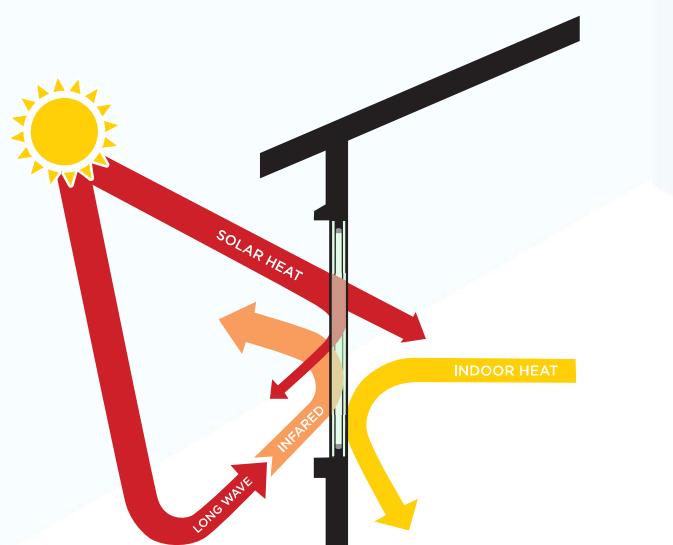
LumaTherm® Insulating Glass Units

Glass Type	Visible Properties (%)			Solar Properties (%)				
	Trans	Ext. Refl.	Int. Refl.	Direct Trans	Ext. Refl.	Solar Heat Gain Coeff.	U-Value (W/m²K)	Shading Coeff.
4mm Clear / 12mm Air / 4mm LumaTherm #3	80	14	14	51	30	0.56	1.7	0.65
4mm Grey / 12mm Air / 4mm LumaTherm #3	50	8	12	33	16	0.39	1.7	0.45
6.38mm Clear Laminate / 12mm Air / 4mm LumaTherm #3	79	13	14	48	21	0.53	1.7	0.61
6.38mm Light Grey Laminate / 12mm Air / 4mm LumaTherm #3	52	8	12	34	16	0.40	1.7	0.46
6.38mm Grey Laminate / 12mm Air / 4mm LumaTherm #3	37	7	12	27	14	0.33	1.7	0.38
6mm Clear / 12mm Air / 6mm LumaTherm #3	79	13	14	48	26	0.54	1.7	0.62
6mm Grey / 12mm Air / 6mm LumaTherm #3	37	6	11	25	12	0.32	1.7	0.36
6.38mm Clear Laminate / 12mm Air / 6mm LumaTherm #3	78	13	14	47	21	0.53	1.7	0.61
6.38mm Light Grey Laminate / 12mm Air / 6mm LumaTherm #3	55	9	12	35	16	0.42	1.7	0.48
6.38mm Grey Laminate / 12mm Air / 6mm LumaTherm #3	39	7	12	27	14	0.34	1.7	0.39

LumaTherm® Argon-Filled Insulating Glass Units

Glass Type	Visible Properties (%)			Solar Properties (%)				
	Trans	Ext. Refl.	Int. Refl.	Direct Trans	Ext. Refl.	Solar Heat Gain Coeff.	U-Value (W/m²K)	Shading Coeff.
4mm Clear / 12mm Argon / 4mm LumaTherm #3	80	14	14	51	30	0.56	1.4	0.65
4mm Grey / 12mm Argon / 4mm LumaTherm #3	50	8	12	33	16	0.39	1.4	0.45
6.38mm Clear Laminate / 12mm Argon / 4mm LumaTherm #3	79	13	14	48	21	0.53	1.4	0.61
6.38mm Light Grey Laminate / 12mm Argon / 4mm LumaTherm #3	52	8	12	34	16	0.40	1.4	0.46
6.38mm Grey Laminate / 12mm Argon / 4mm LumaTherm #3	37	7	12	27	14	0.33	1.4	0.38
6mm Clear / 12mm Argon / 6mm LumaTherm #3	79	13	14	48	26	0.54	1.4	0.62
6mm Grey / 12mm Argon / 6mm LumaTherm #3	37	6	11	25	12	0.32	1.4	0.36
6.38mm Clear Laminate / 12mm Argon / 6mm LumaTherm #3	78	13	14	47	21	0.53	1.4	0.61
6.38mm Light Grey Laminate / 12mm Argon / 6mm LumaTherm #3	55	9	12	35	16	0.42	1.4	0.48
6.38mm Grey Laminate / 12mm Argon / 6mm LumaTherm #3	39	7	12	27	14	0.34	1.4	0.39

How EcoTherm® & LumaTherm® IGU's Perform



EcoTherm® Insulating Glass Units

Glass Type	Visible Properties (%)			Solar Properties (%)		Centre of Glass Results		
	Trans	Ext. Refl.	Int. Refl.	Direct Trans	Ext. Refl.	Solar Heat Gain Coeff.	U-Value (W/m²K)	Shading Coeff.
4mm Clear / 10mm Air / 4mm Clear	82	16	16	73	15	0.77	2.8	0.89
4mm Clear / 12mm Air / 4mm Clear	82	16	16	73	15	0.77	2.7	0.89
5mm Clear / 10mm Air / 5mm Clear	79	15	15	63	12	0.72	2.8	0.83
5mm Clear / 12mm Air / 5mm Clear	79	15	15	63	12	0.72	2.7	0.83
6mm Clear / 10mm Air / 6mm Clear	78	15	15	62	12	0.71	2.8	0.82
6mm Clear / 12mm Air / 6mm Clear	78	15	15	62	12	0.71	2.7	0.82
4mm Green / 10mm Air / 4mm Clear	74	14	15	50	9	0.58	2.8	0.67
4mm Green / 12mm Air / 4mm Clear	74	14	15	50	9	0.58	2.7	0.67
6mm Green / 12mm Air / 6mm Clear	68	12	14	39	8	0.50	2.7	0.57
4mm Grey / 10mm Air / 4mm Clear	50	9	14	47	8	0.56	2.8	0.64
4mm Grey / 12mm Air / 4mm Clear	50	9	14	47	8	0.56	2.7	0.64
6mm Grey / 12mm Air / 6mm Clear	37	7	12	33	7	0.46	2.7	0.53
6mm SuperGrey / 12mm Air / 6mm Clear	8	4	11	6	4	0.22	2.7	0.25
6mm Dark Grey / 12mm Air / 6mm Clear	14	4	12	24	5	0.38	2.7	0.44
6mm Light Grey / 12mm Air / 6mm Clear	56	10	13	44	8	0.55	2.6	0.63
6mm Bronze / 12mm Air / 6mm Clear	43	8	12	38	7	0.50	2.7	0.57
6mm Panasap Dark Blue / 12mm Air / 6mm Clear	51	8	13	35	7	0.47	2.7	0.54
6mm SuperBlue / 12mm Air / 6mm Clear	47	8	13	27	6	0.40	2.7	0.46
6mm SuperGreen / 12mm Air / 6mm Clear	59	10	13	28	6	0.41	2.7	0.47
6mm Azuria / 12mm Air / 6mm Clear	61	11		27	7	0.40	2.7	0.45

G.James Brands & Product Descriptions

Brand Name	Product Description
EcoTherm®, EcoTherm-R, EcoTherm®DLE52, EcoTherm®Solarban60 and Ecotherm®Solarban70	Basic to high performance Low-E Coated IGU's (residential and commercial applications)
LumaTherm®	Low-E Coated IGU with high transmission (residential & showroom/shopfront display applications)
OptiLam®	Laminated Safety Glass
OptiLam® Acoustic	Laminated Safety Glass with acoustic interlayer
OptiLam® HSG	Laminated Safety Glass with heat strengthened glass
OptiLam® TG	Laminated Safety Glass with toughened glass
OptiLam® DG	Laminated Safety Glass with DG41 interlayer
OptiLam® SG	Laminated Safety Glass with SG (SentryGlas) interlayer
OptiLam® Observation	Laminated Safety Glass with one-way vision
OptiLam® Floor	Laminated Safety Glass with non-slip
OptiLam® Vanceva	Laminated Safety Glass with Vanceva coloured interlayer
OptiSafe HSG	Heat Strengthened Glass
OptiSafe HG/TSK	Toughened Heat-Soaked Safety Glass
OptiSafeTG	Toughened Safety Glass
OptiScreen	Privacy Glass (including Acid Etched and Laminate with Cool White & Artic Snow interlayer)
ShieldTek	High impact glass for security and transport applications
Solarplus®	Reflective Coated Glass (S108 and S130)
Solect®	Low-E Laminated Safety Glass

EcoTherm® Coated Insulating Glass Units

Glass Type	Visible Properties (%)			Solar Properties (%)				
	Trans	Ext. Refl.	Int. Refl.	Direct Trans	Ext. Refl.	Solar Heat Gain Coeff.	U-Value (W/m²K)	Shading Coeff.
4mm Clear Low-E #2 / 12mm Air / 4mm Clear	75	17	19	60	15	0.65	2.0	0.75
6mm Clear Low-E #2 / 12mm Air / 6mm Clear	72	16	17	52	14	0.61	1.9	0.71
4mm Sunergy on Clear #2 / 12mm Air / 4mm Clear	61	13	18	43	12	0.50	2.1	0.58
6mm Sunergy on Clear #2 / 12mm Air / 6mm Clear	62	13	16	41	12	0.50	2.1	0.58
4mm SolTech on Clear #2 / 12mm Air / 4mm Clear	56	12	17	40	11	0.46	1.9	0.53
6mm SolTech on Clear #2 / 12mm Air / 6mm Clear	53	11	16	35	9	0.45	1.9	0.52
6mm Clear / 12mm Air / 6mm Low-E on Clear #3	72	17	16	52	15	0.67	1.9	0.77
6mm Green / 12mm Air / 6mm Low-E on Clear #3	63	14	15	33	9	0.45	1.9	0.52
6mm Grey / 12mm Air / 6mm Low-E on Clear #3	34	7	14	27	8	0.40	1.9	0.46
6mm Light Grey / 12mm Air / 6mm Low-E on Clear #3	51	11	14	37	10	0.50	1.9	0.58
6mm Bronze / 12mm Air / 6mm Low-E on Clear #3	40	8	14	31	9	0.45	1.9	0.51
6mm Panasap Dark Blue / 12mm Air / 6mm Low-E on Clear #3	47	10	14	29	8	0.42	1.9	0.48
6mm SuperBlue / 12mm Air / 6mm Low-E on Clear #3	43	9	14	23	7	0.34	1.9	0.40
6mm SuperGreen / 12mm Air / 6mm Low-E on Clear #3	55	11	14	25	7	0.35	1.9	0.41
6mm Low-E on Green #2 / 12mm Air / 6mm Clear	63	13	16	33	9	0.42	1.9	0.48
6mm Low-E on Grey #2 / 12mm Air / 6mm Clear	35	8	16	29	8	0.39	1.9	0.45
6mm Low-E on Light Grey #2 / 12mm Air / 6mm Clear	51	11	14	37	10	0.45	1.9	0.58
6mm Low-E on SuperGreen #2 / 12mm Air / 6mm Clear	54	11	16	24	7	0.33	1.9	0.38
6mm Sunergy on Grey #2 / 12mm Air / 6mm Clear	30	6	15	23	7	0.34	2.1	0.39
6mm SolTech Grey #2 / 12mm Air / 6mm Clear	27	6	14	19	6	0.29	1.9	0.33
6mm EVantage #2 / 12mm Air / 6mm Clear	60	29	31	47	21	0.55	2.0	0.64
6mm EVantage Blue-Green #2 / 12mm Air / 6mm Clear	51	21	30	29	12	0.38	2.0	0.44
6mm EVantage Grey #2 / 12mm Air / 6mm Clear	29	11	30	24	9	0.34	2.0	0.39
6mm EVantage Bronze #2 / 12mm Air / 6mm Clear	34	13	29	28	11	0.38	2.0	0.44
6mm EVantage SuperGreen #2 / 12mm Air / 6mm Clear	43	17	30	20	9	0.29	2.0	0.34
6mm EVantage SuperBlue #2 / 12mm Air / 6mm Clear	35	13	30	19	9	0.29	2.0	0.34
6mm Solarban 60 #2 / 12mm Air / 6mm Clear	70	11	12	34	28	0.39	1.7	0.45
6mm Solarban 70 #2 / 12mm Air / 6mm Clear	64	13	14	23	40	0.28	1.6	0.32
6mm DLE52 #2 / 12mm Air / 6mm Clear	50	16	13	21	41	0.26	1.6	0.29
6mm DLE52 #2 / 12mm Air / 6mm Green	43	16	10	17	41	0.25	1.6	0.29
6mm DLE52 #2 / 12mm Air / 6mm Grey	23	15	6	11	41	0.24	1.6	0.27
6mm DLE52 #2 / 12mm Air / 6mm Bronze	27	16	7	12	41	0.24	1.6	0.28
6mm DLE52 #2 / 12mm Air / 6mm Panasap Dark Blue	33	16	8	14	41	0.24	1.6	0.28
6mm DLE52 #2 / 12mm Air / 6mm SuperBlue	30	16	7	12	41	0.24	1.6	0.28
6mm DLE52 #2 / 12mm Air / 6mm SuperGreen	38	16	9	13	41	0.24	1.6	0.28
6mm Green / 12mm Air / 6mm DLE52 #3	43	10	16	17	12	0.33	1.6	0.38
6mm Grey / 12mm Air / 6mm DLE52 #3	23	6	15	11	14	0.25	1.6	0.29
6mm Bronze / 12mm Air / 6mm DLE52 #3	27	7	16	12	17	0.27	1.6	0.31
6mm Panasap Dark Blue / 12mm Air / 6mm DLE52 #3	33	8	16	14	12	0.29	1.6	0.34
6mm SuperBlue / 12mm Air / 6mm DLE52 #3	30	7	16	12	8	0.26	1.6	0.30
6mm SuperGreen / 12mm Air / 6mm DLE52 #3	38	9	16	13	8	0.28	1.6	0.32
6mm Solarplus S130 #2 / 12mm Air / 6mm Clear	29	19	26	23	14	0.35	2.6	0.40

EcoTherm® Argon-Filled Coated Insulating Glass Units

Glass Type	Visible Properties (%)			Solar Properties (%)				
	Trans	Ext. Refl.	Int. Refl.	Direct Trans	Ext. Refl.	Solar Heat Gain Coeff.	U-Value (W/m²K)	Shading Coeff.
4mm Clear Low-E #2 / 12mm Argon / 4mm Clear	75	17	19	60	15	0.65	1.7	0.75
6mm Clear Low-E #2 / 12mm Argon / 6mm Clear	72	16	17	52	14	0.61	1.7	0.70
4mm Sunergy on Clear #2 / 12mm Argon / 4mm Clear	61	13	18	43	12	0.50	1.9	0.57
6mm Sunergy on Clear #2 / 12mm Argon / 6mm Clear	62	13	16	41	12	0.50	1.8	0.58
4mm SolTech on Clear #2 / 12mm Argon / 4mm Clear	56	12	17	40	11	0.46	1.7	0.53
6mm SolTech on Clear #2 / 12mm Argon / 6mm Clear	56	12	16	37	10	0.45	1.6	0.52
6mm Clear / 12mm Argon / 6mm Low-E on Clear #3	72	17	16	52	15	0.67	1.7	0.77
6mm Green / 12mm Argon / 6mm Low-E on Clear #3	63	14	15	33	9	0.44	1.7	0.51
6mm Light Grey / 12mm Argon / 6mm Low-E on Clear #3	50	11	14	36	10	0.49	1.7	0.56
6mm Grey / 12mm Argon / 6mm Low-E on Clear #3	34	7	14	27	8	0.40	1.7	0.46
6mm Bronze / 12mm Argon / 6mm Low-E on Clear #3	40	8	14	31	9	0.44	1.7	0.51
6mm Low-E on Green #2 / 12mm Argon / 6mm Clear	63	13	16	33	9	0.41	1.6	0.47
6mm Low-E on Light Grey #2 / 12mm Argon / 6mm Clear	51	10	15	36	9	0.45	1.6	0.52
6mm Low-E on Grey #2 / 12mm Argon / 6mm Clear	35	8	16	29	8	0.39	1.6	0.44
6mm Low-E on SuperGreen #2 / 12mm Argon / 6mm Clear	54	11	16	24	7	0.32	1.6	0.37
6mm Sunergy on Grey #2 / 12mm Argon / 6mm Clear	30	6	15	23	7	0.34	1.9	0.39
6mm SolTech Grey #2 / 12mm Argon / 6mm Clear	27	6	14	19	6	0.28	1.6	0.33
6mm EVantage #2 / 12mm Argon / 6mm Clear	60	29	31	47	21	0.55	1.7	0.63
6mm EVantage Grey #2 / 12mm Argon / 6mm Clear	29	10	30	24	9	0.33	1.7	0.38
6mm EVantage Bronze #2 / 12mm Argon / 6mm Clear	34	13	29	28	11	0.37	1.7	0.43
6mm EVantage SuperBlue #2 / 12mm Argon / 6mm Clear	35	13	30	19	9	0.28	1.7	0.32
6mm EVantage Blue-Green #2 / 12mm Argon / 6mm Clear	51	21	30	29	12	0.38	1.7	0.43
6mm EVantage SuperGreen #2 / 12mm Argon / 6mm Clear	43	17	30	20	9	0.28	1.7	0.33
6mm Solarban 60 #2 / 12mm Argon / 6mm Clear	70	11	12	34	28	0.39	1.4	0.44
6mm Solarban 70 #2 / 12mm Argon / 6mm Clear	64	13	14	23	40	0.27	1.3	0.31
6mm DLE52 #2 / 12mm Argon / 6mm Clear	50	16	13	21	41	0.26	1.3	0.29
6mm DLE52 #2 / 12mm Argon / 6mm Green	43	16	10	17	41	0.25	1.3	0.29
6mm DLE52 #2 / 12mm Argon / 6mm Grey	23	15	6	11	41	0.24	1.3	0.27
6mm DLE52 #2 / 12mm Argon / 6mm Bronze	27	16	7	12	41	0.24	1.3	0.28
6mm DLE52 #2 / 12mm Argon / 6mm Panasap Dark Blue	33	16	8	14	41	0.24	1.3	0.28
6mm DLE52 #2 / 12mm Argon / 6mm SuperBlue	30	16	7	12	41	0.24	1.3	0.28
6mm DLE52 #2 / 12mm Argon / 6mm SuperGreen	38	16	9	13	41	0.24	1.3	0.28
6mm Green / 12mm Argon / 6mm DLE52 #3	43	10	16	17	12	0.33	1.3	0.38
6mm Grey / 12mm Argon / 6mm DLE52 #3	23	6	15	11	14	0.25	1.3	0.29
6mm Bronze / 12mm Argon / 6mm DLE52 #3	27	7	16	12	17	0.27	1.3	0.31
6mm Panasap Dark Blue / 12mm Argon / 6mm DLE52 #3	33	8	16	14	12	0.29	1.3	0.34
6mm SuperBlue / 12mm Argon / 6mm DLE52 #3	30	7	16	12	8	0.26	1.3	0.30
6mm SuperGreen / 12mm Argon / 6mm DLE52 #3	38	9	16	13	8	0.28	1.3	0.32
6mm S130 #2 / 12mm Argon / 6mm Clear	29	19	26	23	14	0.34	2.4	0.39